

LETTERS

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NEST DEFENSE AND MOBBING BEHAVIOR OF ELF OWLS

Avian mobbing has been defined as when birds of one or more species assemble near a predator, change perch locations frequently and emit loud vocalizations (E. Curio 1978, *Z. Tierpsychol.* 48:175–183). Predator mobbing is the most widely distributed avian response to predators (A.F. Skutch 1976, Univ. Texas Press, Austin, TX U.S.A.; Curio 1978; I.G. McLean and G. Rhodes 1991, *Current Ornithol.* 8:173–211), and has been the subject of numerous studies (Curio 1978; McLean and Rhodes 1991), but little information exists on nocturnal mobbing by either diurnal or nocturnal species. Such behavior may be rare among diurnal species. For example, Common Terns (*Sterna hirundo*) will group mob Black-crowned Night Herons (*Nycticorax nycticorax*) during diurnal periods but flee from them at night (D.A. Shealer and S.W. Kress 1991, *Colonial Waterbirds* 14:51–56).

Nocturnal species, such as owls, may be more likely to engage in nocturnal mobbing behavior, but accounts of owls mobbing natural predators are rare. Screech-owls (*Otus* spp.) will make vocal and physical attacks on squirrels, snakes, domestic cats and humans (A.C. Bent 1938, Pt. 2. U.S. Natl. Mus. Bull. 170; F.R. Gehlbach 1994, Texas A&M Univ. Press, College Station, TX U.S.A.), and we have captured Western Screech-owls (*O. kennicottii*) in a dho-gaza trap (P.H. Bloom et al. 1992, *J. Raptor Res.* 26:167–178) baited with a Great Horned Owl (*Bubo virginianus*) after dark. Also, Gehlbach (1994) observed a male Eastern Screech-owl (*O. asio*) among a flock of songbirds mobbing a black ratsnake (*E. obsoleta*) in daylight. Martin (1973, *Condor* 75:446–456) reported adult Burrowing Owls (*Speotyto cunicularia*) from territories as far away as 300 m approaching and aiding a resident pair in mobbing a Great Horned Owl.

The Elf Owl (*Micrathene whitneyi*) is the smallest Strigiform (P.M. Walters 1981, *North Am. Bird Bander* 6:104–105). They are territorial but will sometimes nest in close proximity (10 m) to one another (J.D. Ligon 1968, Misc. Pub. Mus. Zool., Univ. Mich. No. 136, Ann Arbor, MI U.S.A.; M.S. Goad and R. W. Mannan 1987, *Condor* 89:659–662). If their nest is approached by a human, Elf Owls may make scolding vocalizations, fly closely by and possibly even strike the intruder (Ligon 1968). However, Elf Owls are little studied and virtually no information is available on their defensive behavior toward natural predators. Herein, we report the defensive behaviors of Elf Owls toward two different predators. The dates of the observations correspond with late incubation and early nestling stages for Elf Owls (Ligon 1968). Thus, we suggest these observations are examples of mobbing as a nest-defense behavior.

On 20 June 1995, at approximately 1950 H, we observed a 91–106 cm long gopher snake (*Pituophis melanoleucus*) climbing a honey mesquite tree (*Prosopis velutina*) at our field station 1.6 km south of Fairbank, Arizona, in the San Pedro Riparian Conservation Area. We knew from adult vocalizations that Elf Owls had been nesting in the tree but we had not located their nest cavity. The snake was approximately 5.5 m above the ground when we visually located an Elf Owl making scolding *cheeur* vocalizations (Ligon 1968) from its perch in the canopy of the tree. Moments later a second Elf Owl flew from a cavity as the snake approached the entrance. When the snake entered the cavity with its head and 8–10 cm of its body, we heard the trilling vocalizations of nestling Elf Owls. By this time it was dark and all further observations were made with the aid of flashlights. Both adult Elf Owls repeatedly changed perches within the canopy of the tree and continued vocalizing, but did not approach the snake when it was in the cavity. After 12–15 min, the snake withdrew from the cavity and began to descend the tree. The Elf Owls increased their vocalization rate and made repeated passes at it, striking its head at least four times. The strikes were powerful enough to propel the snake's head 5–10 cm sideways. The snake stopped at a main crotch of the tree where it was relatively protected from the Elf Owls. The vocalizations of the owls gradually subsided, and we ended our observations at 2022 H. The snake was no longer in the tree when we checked at 0430 H the next morning.

Both owls made flights at the snake, but we could not determine if only one or both had actually struck the snake. During the attacks, a third Elf Owl, presumably from a known adjacent territory, flew to the mesquite and also vocalized. The third owl repeatedly changed perch locations within the canopy but we were unable to determine if it also attacked the snake. Despite being a very territorial species (Ligon 1968), there was no indication of intraspecific aggression between the Elf Owls; all aggression appeared directed toward the snake. We did not observe the defensive wing drooping postures Elf Owls use during intraspecific territorial interactions (Ligon 1968), but this may have been due to the owls' small size and the poor light conditions.

We observed a similar incident in which several Elf Owls attacked a Great Horned Owl. At dusk (approximately 1930 H) on 21 June 1993, we tethered a Great Horned Owl to a perch in our campsite in a riparian woodland near

Aravaipa Creek, Arizona. Almost immediately at least six Elf Owls began vocalizing from dispersed locations around our campsite and at least four of them began making low passes at the Great Horned Owl. Before we could relocate the horned owl to a protected enclosure, it was struck once in the head by an Elf Owl.

Some nocturnal behaviors may not be well known or understood, not because they are rare, but because they are difficult to observe. This may change with the increased availability of night vision equipment (P. Henson and J.A. Cooper 1994, *Auk* 111:1013–1018). Currently, observations of nocturnal behaviors are likely to be sporadic and anecdotal, and therefore unreported. Such information, however, may help in understanding a species biology. For example, other researchers have observed group mobbing by Elf Owls (F.R. Gehlbach, pers. comm.; B.A. Millsap, pers. comm.), but there are no published reports of the behavior. Our observations, and those of other researchers, suggest that Elf Owls will join together in mobbing and that they can be physically aggressive when defending their nests against predators.

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GRIFFON VULTURES (*GYPSES FULVUS*) INGESTING BONES AT THE OSSUARIES OF BEARDED VULTURES (*GYPAETUS BARBATUS*)

Some African vultures overcome the calcium deficiency in their diets by ingesting bone fragments, and are dependent on the presence of large predators to supply them (Mundy and Ledger 1976, *S. Afr. J. Sci.* 72:106–110; Mundy 1982, The comparative biology of southern African vultures, Vulture Study Group, Johannesburg, South Africa; Richardson et al. 1986, *J. Zool. Lond.* 210:23–43). Because of the lack of large mammalian carnivores in the Iberian Peninsula, vultures apparently satisfy their calcium needs by ingesting small bone fragments from carcasses (König 1975, *Ardeola* 21:219–224) or small pieces of limestone (Fernández 1975, *Ardeola* 22:29–54; Elosegi 1989, *Acta Biol. Mont.* 3, Série documents de Travail). This note reports several observations of Griffon Vultures (*Gyps fulvus*) making use of bone splinters obtained from Bearded Vulture (*Gypaetus barbatus*) ossuaries, where large bones are deliberately dropped onto rock slabs (Boudoint 1976, *Alauda* 44:1–21).

Field work was carried out in the meridional Prepyrenees (northeast of Spain), an area of isolated calcareous massifs described by Riba et al. (1976, *Geografía física dels Països catalans*, Ketres, Barcelona, Spain). The data were collected while we were monitoring several Bearded Vulture pairs between 1991–95 at eight ossuaries located in five different nesting areas (Heredia 1991, Pages 78–89 in R. Heredia and B. Heredia [EDS.], *El quebrantahuesos Gypaetus barbatus en los Pirineos*, ICONA, Madrid, Spain) selected at random. All ossuaries had Griffon Vulture colonies nearby (<1 km). We made 126 visits to the nesting areas during the nestling period from February–August.

Griffon and Bearded Vultures interacted at ossuaries in all five nesting areas. Occasionally, Griffon Vultures explored ossuaries when there had been no previous occurrence of bone drops, but more often they were observed at ossuaries after Bearded Vultures had dropped bones. Over a 6-d-period, we observed groups of one to seven Griffon Vultures ($\bar{x} = 2.62$, $SD = 1.99$, $N = 21$) visiting the sites. During a total of 75 bone droppings, Griffon Vultures immediately descended to the ossuaries on 13 occasions (17.3 %) in numbers ranging from one to five individuals ($\bar{x} = 2.30$, $SD = 1.63$, $N = 30$).

On five occasions, Griffon Vultures attempted to pirate bone fragments from Bearded Vultures. Once, when an immature Bearded Vulture was dropping a bone, a Griffon Vulture flew in quickly and ingested small bone fragments next to the place where the impact had occurred before the Bearded Vulture could land. Twice, we observed griffons trying to overtake Bearded Vultures in flight to recover dropped bones, without success. Once, after a Bearded Vulture had perched next to the bone it had dropped, three Griffon Vultures attacked it and seized a large bone fragment which they then proceeded to fight over and ingested. We also saw a Bearded Vulture drop a bone and, once on the ground, five Griffon Vultures attacked the Bearded Vulture forcing it to flee with the prey.

We also observed three Griffon Vultures inside a Bearded Vulture nest that had been used in the previous breeding